

General

Title

Carotid endarterectomy (CEA): volume.

Source(s)

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

AHRQ quality indicators. Inpatient quality indicators: technical specifications [version 4.2]. IQI #7 carotid endarterectomy volume. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 1 p.

Measure Domain

Primary Measure Domain

Structure

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the [Measure Validity](#) page.

Secondary Measure Domain

Outcome

Brief Abstract

Description

This measure is used to assess the raw volume of provider-level carotid endarterectomy (CEA) (surgical procedure).

As a volume indicator, CEA is a proxy measure for quality and should be used with other indicators (see the related National Quality Measures Clearinghouse [NQMC] summary of the Agency for Healthcare Research and Quality [AHRQ] measure [Carotid endarterectomy \(CEA\): mortality rate](#)).

Rationale

About 30% of personal health care expenditures in the United States go towards hospital care, and the rate of growth in spending for hospital services has only recently leveled out after several years of increases following a half a decade of declining growth. Simultaneously, concerns about the quality of health care services have reached a crescendo with the Institute of Medicine's series of reports describing the problem of medical errors and the need for a complete restructuring of the health care system to improve the quality of care. Policymakers, employers, and consumers have made the quality of care in U.S. hospitals a top priority and have voiced the need to assess, monitor, track, and improve the quality of inpatient care.

Carotid endarterectomy (CEA) is a fairly common procedure that requires proficiency with the use of complex equipment; and technical errors may lead to clinically significant complications, such as abrupt carotid occlusion with or without stroke, myocardial infarction, and death. Higher volumes have been associated with better outcomes (e.g., lower mortality and post-operative stroke rates), which represent better quality.

Note: The following caveats were identified from the literature review for the "Carotid Endarterectomy Volume" indicator:

Proxy^b: Indicator does not directly measure patient outcomes but an aspect of care that is associated with the outcome; thus, it is best used with other indicators that measure similar aspects of care.

Easily manipulated^b: Use of the indicator may create perverse incentives to improve performance on the indicator without truly improving quality of care.

Refer to the original measure documentation for further details.

b - Indicates that the concern has been demonstrated in the literature.

Primary Clinical Component

Carotid endarterectomy (CEA); procedure volume

Denominator Description

This measure applies to providers of carotid endarterectomy (CEA) (one provider at a time).

Numerator Description

Discharges, age 18 years and older, with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Carotid Endarterectomy code procedure (3812)

Exclude cases:

Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium)

Evidence Supporting the Measure

Evidence Supporting the Criterion of Quality

A clinical practice guideline or other peer-reviewed synthesis of the clinical evidence

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Evidence Supporting Need for the Measure

Need for the Measure

Variation in capacity

Evidence Supporting Need for the Measure

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

External oversight/State government program

Internal quality improvement

Quality of care research

Application of Measure in its Current Use

Care Setting

Hospitals

Professionals Responsible for Health Care

Physicians

Lowest Level of Health Care Delivery Addressed

Single Health Care Delivery Organizations

Target Population Age

Does not apply to this measure

Target Population Gender

Does not apply to this measure

Stratification by Vulnerable Populations

Does not apply to this measure

Characteristics of the Primary Clinical Component

Incidence/Prevalence

Approximately 144,000 carotid endarterectomies (CEAs) were performed in the United States in 1997.

Evidence for Incidence/Prevalence

Owings MF, Lawrence L. Detailed diagnoses and procedures, National Hospital Discharge Survey, 1997. Vital Health Stat 13. 1999 Dec;(145):1-157. [PubMed](#)

Association with Vulnerable Populations

Unspecified

Burden of Illness

Unspecified

Utilization

Unspecified

Costs

Unspecified

Institute of Medicine (IOM) Healthcare Quality Report Categories

IOM Care Need

Not within an IOM Care Need

IOM Domain

Not within an IOM Domain

Data Collection for the Measure

Case Finding

Does not apply to this measure

Denominator Sampling Frame

Does not apply to this measure

Denominator Inclusions/Exclusions

Inclusions

This measure applies to providers of carotid endarterectomy (CEA) (one provider at a time).

Exclusions

Unspecified

Relationship of Denominator to Numerator

Does not apply to this measure

Denominator (Index) Event

Does not apply to this measure

Denominator Time Window

Does not apply to this measure

Numerator Inclusions/Exclusions

Inclusions

Discharges, age 18 years and older, with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Carotid Endarterectomy code procedure (3812)

Exclusions

Exclude cases:

Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium)

Measure Results Under Control of Health Care Professionals, Organizations and/or Policymakers

The measure results are somewhat or substantially under the control of the health care professionals, organizations and/or policymakers to whom the measure applies.

Numerator Time Window

Institutionalization

Data Source

Administrative data

Level of Determination of Quality

Does not apply to this measure

Outcome Type

Proxy for Outcome

Pre-existing Instrument Used

Unspecified

Computation of the Measure

Scoring

Count

Interpretation of Score

Better quality is associated with a higher score

Allowance for Patient Factors

Does not apply to this measure

Standard of Comparison

External comparison at a point in time

External comparison of time trends

Internal time comparison

Prescriptive standard

Prescriptive Standard

Benchmark:

Threshold 1: 50 or more procedures per year

Threshold 2: 101 or more procedures per year

Evidence for Prescriptive Standard

Hannan EL, Popp AJ, Tranmer B, Fuestel P, Waldman J, Shah D. Relationship between provider volume and mortality for carotid endarterectomies in New York state. Stroke. 1998 Nov;29(11):2292-7. [PubMed](#)

Manheim LM, Sohn MW, Feinglass J, Ujiki M, Parker MA, Pearce WH. Hospital vascular surgery volume

and procedure mortality rates in California, 1982-1994. J Vasc Surg. 1998 Jul;28(1):45-56; discussion 56-8. [PubMed](#)

Nationwide inpatient sample and state inpatient databases. Healthcare Cost and Utilization Project (HCUP). [database]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 1995-1997. [Various pagings].

Evaluation of Measure Properties

Extent of Measure Testing

Each potential quality indicator was evaluated against the following six criteria, which were considered essential for determining the reliability and validity of a quality indicator: face validity, precision, minimum bias, construct validity, fosters real quality improvement, and application. The project team searched Medline for articles relating to each of these six areas of evaluation. Additionally, extensive empirical testing of all potential indicators was conducted using the 1995-97 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. Table 2 in the original measure documentation summarizes the results of the literature review and empirical evaluations on the Inpatient Quality Indicators. Refer to the original measure documentation for details.

Evidence for Reliability/Validity Testing

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

Identifying Information

Original Title

IQI #7 carotid endarterectomy volume.

Measure Collection Name

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

Measure Set Name

Inpatient Quality Indicators

Submitter

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Developer

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Funding Source(s)

Agency for Healthcare Research and Quality (AHRQ)

Composition of the Group that Developed the Measure

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators are in the public domain and the specifications come from multiple sources, including the published and unpublished literature, users, researchers, and other organizations. AHRQ as an agency is responsible for the content of the indicators.

Financial Disclosures/Other Potential Conflicts of Interest

None

Adaptation

Measure was not adapted from another source.

Release Date

2002 Jun

Revision Date

2010 Sep

Measure Status

This is the current release of the measure.

This measure updates previous versions:

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals -- volume, mortality, and utilization [version 3.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Feb 20. 99 p.

AHRQ quality indicators. Inpatient quality indicators: technical specifications [version 4.1]. IQI #7 carotid endarterectomy volume. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2009 Dec 1. 1 p.

Source(s)

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

AHRQ quality indicators. Inpatient quality indicators: technical specifications [version 4.2]. IQI #7 carotid endarterectomy volume. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 1 p.

Measure Availability

The individual measure, "IQI #7 Carotid Endarterectomy Volume," is published in "AHRQ Quality Indicators. Guide to Inpatient Quality Indicators: Quality of Care in Hospitals -- Volume, Mortality, and Utilization" and "AHRQ Quality Indicators. Inpatient Quality Indicators: Technical Specifications." These documents are available in Portable Document Format (PDF) from the [Inpatient Quality Indicators Resources](#) page at the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators Web site.

For more information, please contact the QI Support Team at support@qualityindicators.ahrq.gov.

Companion Documents

The following are available:

AHRQ quality indicators. Inpatient quality indicators: software documentation, SAS [version 4.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 41 p. This document is available in Portable Document Format (PDF) from the [Agency for Healthcare Research and Quality \(AHRQ\) Quality Indicators Web site](#) .

AHRQ quality indicators. Software documentation: Windows [version 4.1a]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Jul 2. 97 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#) .

AHRQ quality indicators. Inpatient quality indicators composite measure workgroup. Final report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Mar. various p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#) .

UCSF-Stanford Evidence-based Practice Center. Davies GM, Geppert J, McClellan M, et al. Refinement of the HCUP quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2001 May. 24 p. (Technical review; no. 4). This document is available in PDF from the [AHRQ Quality Indicators Web site](#) .

AHRQ quality indicator. Comparative data for the IQI based on the 2008 Nationwide Inpatient Sample (NIS) [version 4.1b]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 20 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#) .

AHRQ quality indicator. Risk adjustment coefficients for the IQI [version 4.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 20 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#) .

AHRQ quality indicators. Composite measures user guide for the inpatient quality indicators (IQI) [version 4.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 6 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#) .

HCUPnet: a tool for identifying, tracking, and analyzing national hospital statistics. [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); [accessed 2011 May 24]. HCUPnet is available from the [AHRQ Web site](#) . See the related [QualityTools](#) summary.

NQMC Status

This NQMC summary was completed by ECRI on August 19, 2004. The information was verified by the measure developer on October 13, 2004. This NQMC summary was updated by ECRI on March 4, 2005. The information was verified by the measure developer on April 22, 2005. This NQMC summary was updated by ECRI Institute on August 17, 2006, on May 29, 2007, on October 20, 2008 and again on August 27, 2010. This NQMC summary was reviewed and edited by ECRI on July 13, 2011.

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